

# CUSTOMER **Circuit**

WINTER 2017

WESTERN AREA POWER ADMINISTRATION

## 2017 State of WAPA's Assets

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## ADMINISTRATOR'S LETTER – STATE OF THE ASSETS

February 2017

**M**anagement of our critical assets is key to the safety, security and reliability of a significant portion of the Western electric grid, one that has helped our communities grow, prosper and be competitive in the global landscape. The investments in these assets represent a significant financial commitment supported by our customers and our nation.

We calculate decisions for maintaining this vast network and delivering on our mission by combining a sound, data-driven approach through asset management, continually refining our 10-year capital planning process and leveraging the tremendous intellectual capital of our staff.

These investments, totaling \$838 million during the past five years and projected to be \$1.6 billion in the next 10 years, allow WAPA to continue to be among those who provide the most cost-effective and cost-competitive energy in the U.S.

Together we face the energy frontier to plan for our shared success so those same communities—and the many that follow—will remain competitive now and well into the future.

As we look ahead, our Asset Management 2.0 Program will enhance our capabilities to manage the \$4.3 billion in assets entrusted to us.

In 2016, we saw many challenges that spurred us forward; and our staff responded with surety by:

- **Embedding excellence into the organization:** We met the demands for critical infrastructure protection compliance, increased security, standardized financial systems and an agile Information Technology structure in a cost-effective manner.
- **Strengthening compliance:** Our internal audit and compliance group helped us improve systems and strengthen our controls.
- **Continuing to improve processes:** Our Continuous Process Improvement program reached \$22.7 million in avoided costs by streamlining processes throughout our organization. In 2017, we are aggressively expanding the CPI program, as we seek to double or even triple our cost avoidance.
- **Reducing rates through drought-adder component:** WAPA staff in the Rocky Mountain and Upper Great Plains regions successfully implemented a drought-adder reduction due to repaying a significant amount of long-term drought costs early.

Building upon these accomplishments, we will focus our sights on the prospects just beyond the horizon. We need tools that travel at the same speed as the electrons we transmit. We need to invest in new technology and work together to determine who pays for upgrades in a financially shared structure. Looking ahead, we need to build resiliency and security into our design.

**"WE NEED  
TO BUILD  
RESILIENCY  
AND SECURITY  
INTO OUR  
DESIGN."**

In 2017, WAPA's ruby anniversary, we have marked a path through our Annual Performance Plan to track our steps in being responsive to the evolving industry, taking our strategies and processes for measuring system health to the next level and serving customers with excellence. These goals require continuing to work directly with all of our customers. For the 40 million Americans receiving the benefits of our power deliveries, we must stay robust in this era of change, working to keep costs low while recognizing sound business practices.



Partnership is at the center of all of this. Our success is your success. This message is stronger when we deliver it together.

For 40 years we have built a tradition of involvement, partnership and investment in our nation's infrastructure. Today our roles are changing as we chart a clear path through industry trends and markets to new opportunities not seen in the past half century. Through our dedication to organizational excellence and our collaborative customer engagement, we are preparing our operations to continue providing the assurance and dependability synonymous with WAPA.

The pace of change in the energy landscape is only increasing. Working with our customers, other government entities and the public, we have supported strong communities . . . communities that have grown and flourished since the West was developed more than a century ago.

Together we will see it forward in a secure, affordable and reliable energy future.

A handwritten signature in black ink, appearing to read 'Mark A. Gabriel'.

Mark A. Gabriel  
Administrator and CEO





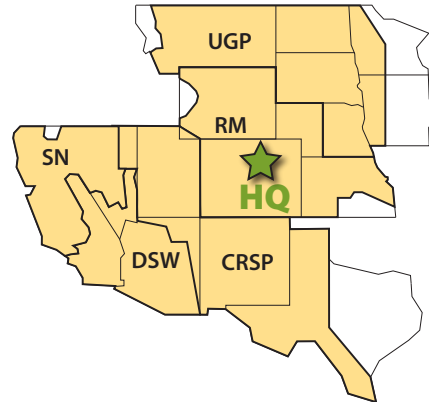
WAPA's Headquarters office (Photo by Travis Weger)

## HEADQUARTERS

**W**APA operates a distributed business model with the organization's various functions spread throughout a 15-state, 1.4-million-square-mile territory. Located in Lakewood, Colorado, WAPA's Headquarters serves many diverse customers, ranging from Congress to Native American power customers, other government agencies and WAPA's regional offices. HQ is home base for WAPA's Administrator and CEO, the General Counsel and the organization's economic impact and diversity, public affairs, engineering, administrative, operating, financial and information technology offices.

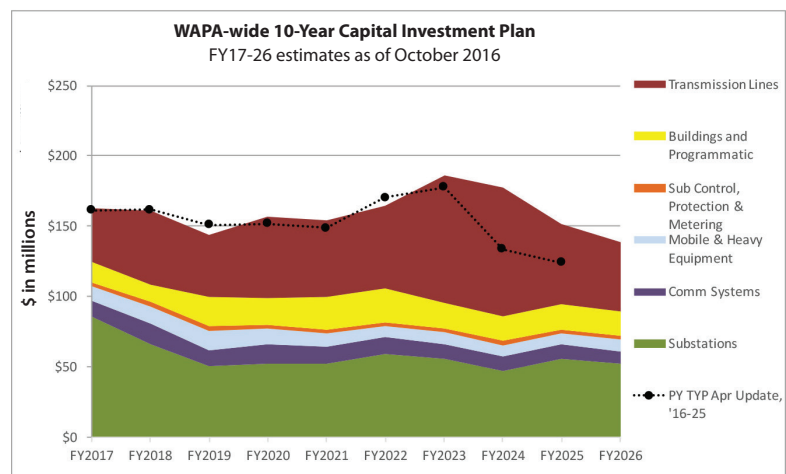
Within these functions, WAPA accomplishes the "behind-the-scenes" work to ensure we fulfill the needs of our 681 firm electric service utility customers, who then provide electricity to more than 40 million people in the West. This work includes representing WAPA in Washington, D.C., conducting public meetings and developing publications such as the annual report, managing finances and WAPA's annual budget, focusing support on WAPA-wide employee safety and system security, designing and maintaining facilities for our power systems, supporting renewable resources and environmental protection, providing technical assistance with energy services and supporting the power marketing community.

In winter 2016, WAPA published its Fiscal Year 2016 Annual Report and KPMG's audit of the FY 2016 financial statements yielded no findings. In fall 2016, WAPA held its first technical meeting with several customer representatives to discuss the 10-Year Capital Plan for the Headquarters office. The meeting provided participants an early look into WAPA's HQ Budget Formulation Process for capital planning, as well as an opportunity to provide feedback regarding the details of various budgetary items. The meeting was followed by an annual customer meeting in December 2016 to review 10-year capital plans WAPA-wide.



Last year HQ provided WAPA-wide benefits to customers through integrating technology changes, including:

- **Integrated NERC CIPv5 standards:** Leveraging the same process for collecting and tracking how WAPA is meeting North American Electric Reliability Corporation Critical Infrastructure Protection Version 5 Standards, or CIPv5, consistently throughout its program streamlines future software and hardware updates, as well as integration of future CIP standards.
- **Increased network security:** Completed Phase 1 of adding in enclaves that bolster cybersecurity through increased segmentation, and avoids \$6.5 million over the next 5 years through implementing one tool WAPA-wide.



- **Leveraging economies of scale:** WAPA avoided \$5 million in FY 2016 by consolidating Information Technology software and hardware purchases, leveraging technology to avoid travel, and using prudent system design for improved data quality.
- **Prepared data transfer for market agreement:** Through technological adjustments that supported the Market Efficiency Enhancement Agreement, Sierra Nevada staff saved customers \$1.8 million in power costs.

In 2017 and beyond, HQ staff will continue to mature HQ's capital investment plan through a more transparent process. HQ staff will also focus on capital investment drivers, like lifecycle replacements and cybersecurity, to ensure programs and projects remain highly dependable. Some upcoming projects include:

- **System, application upgrades:** WAPA is upgrading several of its enterprise applications across the organization to maintain a proactive cyber secure stance and eliminate vulnerabilities in support systems to ensure our infrastructure and the bulk electric system remain reliable.
- **Helicopter replacements:** HQ's Aviation Program manages aviation staff and equipment, including helicopters that have become an integral part of WAPA's maintenance infrastructure programs. Plans for the synchronized replacement of helicopters in each of our regions are underway.

WAPA is committed to being prepared to make funding allocation decisions that support the current system reliability as a top priority, while working within a flat budget.

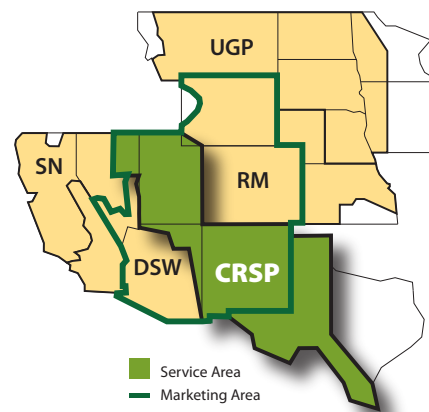
## State of the Regions

### COLORADO RIVER STORAGE PROJECT MANAGEMENT CENTER

**T**he main resources of the Colorado River Storage Project Management Center are the 11 powerplants consolidated into a single power rate known as the Salt Lake City Area/Integrated Projects, or SLCA/IP, which includes Glen Canyon Dam near Page, Arizona. That single powerplant provides 76 percent of the generated energy provided to the CRSP MC's 157 customers, more than one-third of which are Native American tribes. Wholesale preference customers distribute clean, reliable hydropower to about five million retail consumers across a six-state area, including Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. The CRSP MC owns 2,323 miles of transmission lines, 248 breakers and 35 transformers.

The SLCA/IP rate through 2020 is set, and rates have held steady since Fiscal Year 2010. In 2017, the CRSP MC's power marketing staff will continue its work on two proposed marketing plans:

- **2018 Proposed Olmsted Power Marketing Plan:** A new hydroelectric power resource anticipated to be marketed in summer 2018. Once the marketing plan is final, WAPA will submit a *Federal Register* notice to establish a corresponding power rate for this new project.
- **2025 SLCA/IP Final Marketing Plan:** The plan was published and made final at the end of



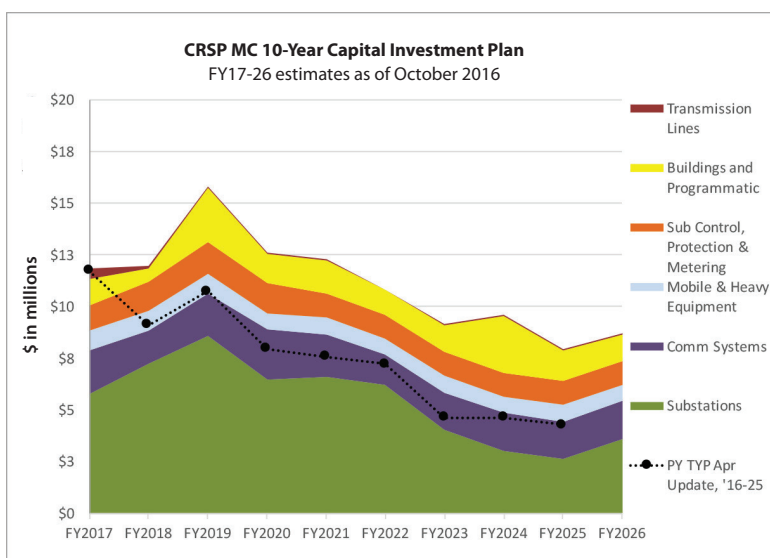
2016. There are no significant changes from the existing marketing plan, and contract staff have prepared and distributed draft 2025 Marketing Plan contracts for customer review. The 2025 Marketing Plan contracts will provide customers long-term assurance and stability for their hydropower allocations through 2057.

Last year, CRSP MC consolidated Power Billing services to reduce expenses and provide billing to CRSP customers from a single office. Staff also used continuous improvement efforts to budget asset replacements and system upgrades to increase reliability.

In 2017, CRSP MC will implement results of the Glen Canyon Dam Long-Term Experimental and Management Plan Record of Decision that was signed on Dec. 15, 2016. In addition, CRSP will continue to work with the Mountain West Transmission Group to determine potential benefits of regional transmission organization membership.

Looking to capitalize on the best use of its office space, the CRSP MC is determining a new location for its office in Salt Lake City when its current lease expires in November. The new office will remain in the Salt Lake City area and will leverage office initiatives to reduce space for records storage, as well as implement best practices for office flexibilities and

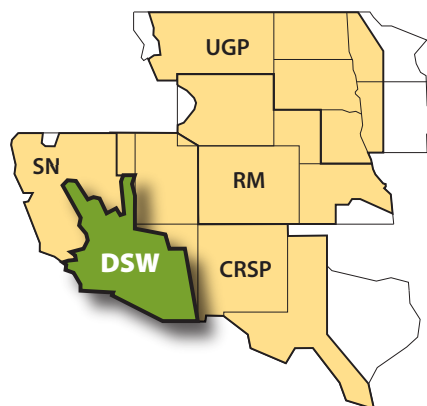
telecommuting arrangements to reduce the needed office space by about 20 percent.



## DESERT SOUTHWEST

The Desert Southwest region markets hydroelectric power to nearly 70 municipalities, cooperatives, federal and state agencies and irrigation districts in California, Arizona and Nevada from powerplants operated at Hoover, Parker and Davis dams. Power is also marketed from hydroelectric projects in the Bureau of Reclamation's Upper Colorado region and the federal portion of power generated at Navajo Generating Station near Page, Arizona. DSW maintains more than 75 substations, 2,556 miles of transmission lines ranging from 34.5-kilovolt to 500-kV and 86 communication sites to provide safe, secure, reliable and affordable energy and transmission services to our customers.

In October, DSW will begin delivering power to almost 60 new customers in Arizona, Nevada and southern California through the Post-2017 Boulder Canyon Project contracts. The culmination of a nine-year remarketing effort, the 50-year contracts widen the reach of hydroelectric power generated from Hoover Dam, which is the highest and third-largest concrete dam in the United States. In 2017, DSW will focus on the implementation of the contracts. This will include information sessions to help customers understand the various services and functions that DSW provides, the tools that will be used to exchange information between customers and WAPA and rate-related topics such as the public process, Power Repayment Study and billing determinants.



As communities throughout DSW continue to grow, so do their need for energy and transmission services. DSW, in partnership with its customers, continues to identify and prioritize capital projects and investment needs through its 10-year capital planning process. In 2017, WAPA will focus on a few of the projects that present the best value for its DSW customers, including:

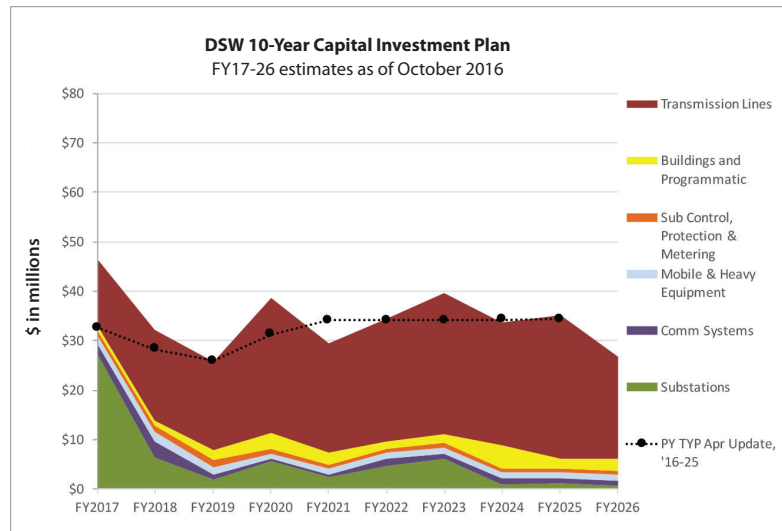
- **Tucson Substation:** Construct a new 230-kV substation yard with control building that will replace the existing 115-kV yard to prepare for future capacity needs.
- **ED2-to-Saguaro No. 2 Transmission Line upgrade:** Crews will replace 37 miles of wood poles with steel monopoles to current 115-kV standards, which will strengthen the local grid infrastructure.

- **Liberty Series Capacitor Bank rebuild:** The construction of a new 345-kV capacitor bank is needed to replace the existing equipment that is more than 45 years old. The rebuild will ensure the continued reliability of the local system.
- **Gila-to-Wellton Mohawk Transmission Line Interstate 8 crossing and rebuild:** To increase reliability, WAPA crews will rebuild the line that crosses Interstate 8 to replace 2.8 miles of aged wooden structures with steel monopoles near Telegraph Pass.

In 2017, WAPA staff and Southline LLC will continue to work together on the Southline Project. The proposed project consists of about 240 miles of new, 345-kV, double-circuit transmission lines between the existing substations in Afton, New Mexico, and Apache, Arizona; and a series of upgrades to about 120 miles of WAPA's existing Parker-Davis Project transmission lines. The proposed upgrades would replace the single-circuit 115-kV with double-circuit 230-kV, between Arizona's Apache and Saguaro substations. The upgrades to the Parker-Davis Project facilities would be paid for by Southline, with the potential effect of avoiding about \$120 million from WAPA's 10-year capital planning and ultimately from the Parker-Davis Project rates. WAPA

is continuing to gather customer feedback and is considering whether participation in the project is in WAPA's best interest.

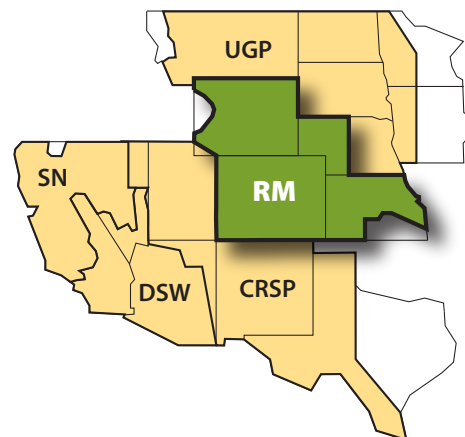
In 2017, DSW will continue to work with its customers to address the changing industry landscape by analyzing various market participation scenarios to evaluate the options, benefits and costs associated that would create the greatest value for WAPA customers. More analysis is also being undertaken to review the Pacific Northwest-Southwest Intertie Project in DSW and determine how to best optimize the project over the long term. Customers have and will continue to be invited to actively participate in these efforts to help find the best path forward.



## ROCKY MOUNTAIN

**T**he Rocky Mountain region serves about 79 power customers in Colorado, Wyoming, Nebraska and Kansas. It sells more than 2.4 million megawatt-hours of power generated at 20 hydroelectric plants in the Loveland Area Projects, which combines both the Fryingpan-Arkansas Project and the Pick-Sloan Missouri Basin Program—Western Division. RM reliably delivers federal and non-federal power through 3,432 miles of transmission lines, 390 breakers and 80 substations.

Focused on keeping costs low while still meeting mission-critical needs, power marketing staff from RM and the Upper Great Plains region continue to track the rates needed for hydropower project operation and maintenance costs, as well as account for drought conditions. In January, LAP customers had their rates



reduced through a drought-adder reduction in the Pick-Sloan Missouri Basin Program, as drought costs were repaid ahead of schedule. The change represents a 12-percent reduction to current Pick-Sloan Missouri



Basin Program composite rates, resulting in roughly \$50 million saved annually in power costs for RM and UGP customers across Colorado, the Dakotas, Kansas, Montana, Nebraska, Wyoming and the western sections of Minnesota and Iowa.

Additionally, the effort to consolidate backup operations for WAPA's control centers in Loveland and Phoenix was completed in December 2016, representing \$11 million in avoided costs for customers. Now Loveland and Phoenix operations can seamlessly assume control of each other's operations using standardized software, eliminating the need for alternate control centers.

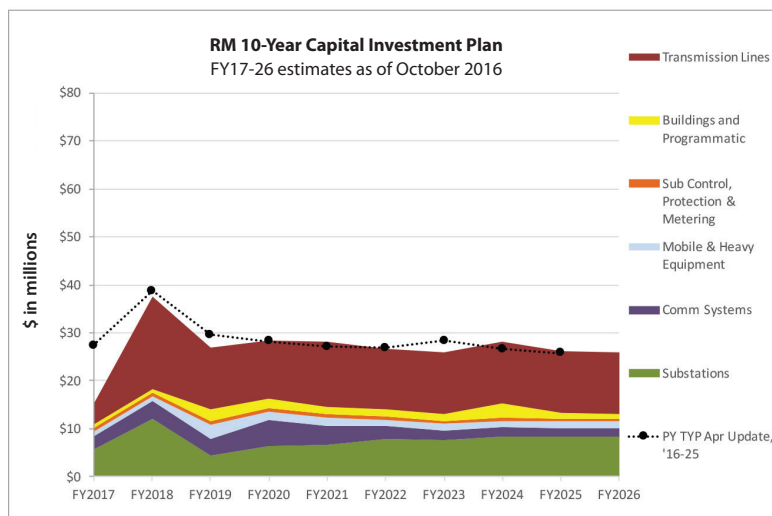
In 2017, RM staff will continue to evolve its operations, products and services. WAPA, through participation in the Mountain West Transmission Group, is analyzing the impacts, costs and benefits of participating in a regional transmission organization, or RTO, for itself and its customers. The group of 10 utility neighbors is in discussions with the Southwest Power Pool as the next step in exploring potential membership with a particular RTO. In the event these discussions with SPP are unsuccessful, the participants may pursue similar discussions with either the Midcontinent Independent System Operator, PJM Interconnection or both. The group anticipates making a decision in mid-2017, with the goal of implementing any changes in early 2019.

Maintaining a reliable, resilient transmission system also requires attention to capital, maintenance and operational projects. In 2016, WAPA selected a preferred route for upgrading two 70-plus-year-old transmission lines between Estes Park and Loveland, Colorado. The final environmental review and record of decision for the project are anticipated in 2017.

Additionally, RM's 10-year capital planning effort will address the following major projects within the next year to ensure asset management health:

- **Replacement of Ault transformer and circuit breakers:** To enhance the local system's reliability in northern Colorado and increase substation capacity, this project will upgrade the current transformer bank with a new 3-phase unit, as well as the associated 345-kilovolt and 230-kV circuit breakers.
- **Rebuild the Granby Pumping Plant-to-Windy Gap transmission line:** In Grand Lake, Colorado, RM staff will replace 12 miles of existing 69-kV line with a double circuit, 138-kV and 69-kV line from the Farr Pumping Plant-to-Windy Gap Substation with the support of LAP customers. Tri-State as a joint participant of the project, is providing customer funding. The project also includes an addition to the Granby Pumping Plant Substation for the 138-kV line. These additions will continue to provide reliable power to the local area after failure of the aging Adams tunnel cable.
- **Big George-to-North Cody Transmission project:** RM will install a new 115-kV line on existing poles between Big George and Cody, Wyoming. The project will also construct a new 115-kV yard at the North Cody Substation to support the new circuit. These additions will provide voltage support in the Cody area.

Leveraging employees' innovation and strong partnerships with customers, RM will continue to ensure a reliable, maintained interconnected grid and deliver high-value services and products to customers.





## SIERRA NEVADA

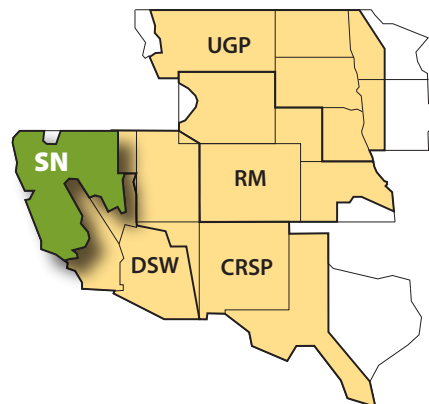
**S**ierra Nevada markets hydroelectric power generated from the Bureau of Reclamation's Central Valley Project to 104 power customers in California including municipal public power utilities, irrigation districts, federal and state entities, Native American tribes and rural electric cooperatives.

The CVP federal transmission system is owned, operated and maintained safely and reliably by WAPA's SN region and consists of 22 substations, 21 transformers and 956 miles of transmission line. SN is also the operating agent for the 350-mile California-Oregon Transmission Project, one of the three lines forming the California-Oregon Intertie.

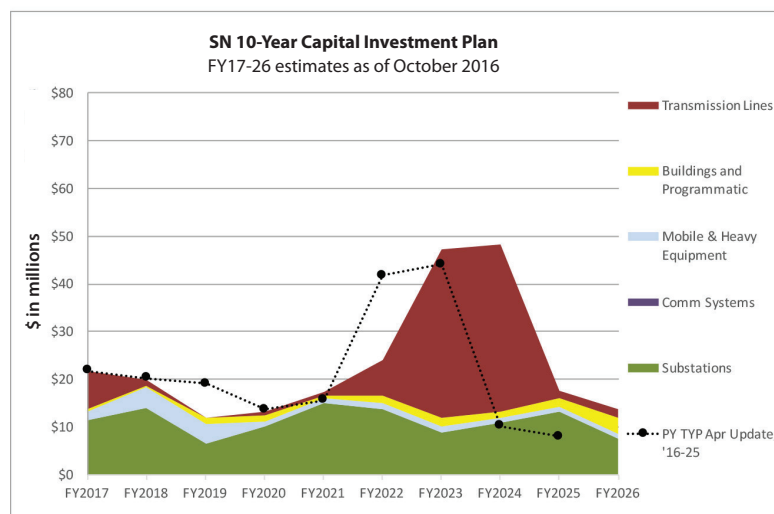
Providing customers hydropower and long-term assurance takes planning. SN continues to make strides on its 2025 Power Marketing Plan. This plan identifies how to allocate, assign and deliver federal hydropower resources from the CVP to existing and potentially new preference power allottees. In 2017, SN anticipates publishing the final marketing plan and requesting allocations for utilities interested in receiving power from the CVP in 2025 and beyond.

In 2016, SN and other Balancing Authority of Northern California participants completed a study of impacts, costs and benefits associated with participation in the California Independent System Operator's Energy Imbalance Market. Based on the cost-benefit analysis, WAPA is continuing its current market operations of delivering 50 percent of its hydropower to WAPA customers within the CAISO EIM. Additionally, WAPA is continuing to work with its customers on market-related tools and strategies based on their individual market participation decisions.

Reclamation is working out how to address protection, restoration and enhancement of fish and wildlife as part of the CVP Improvement Act. SN continues working with Reclamation and customers to find mutually acceptable solutions to the cost of CVP Improvement Act's Environmental Restoration Fund.

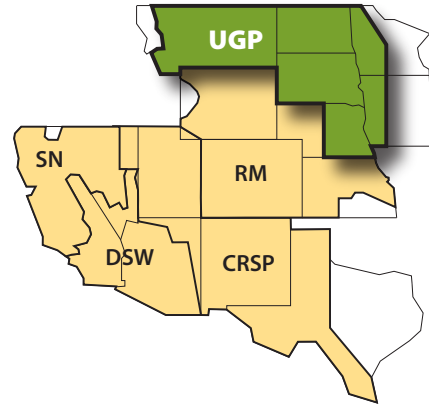


Looking toward the future, SN works closely with its customers to outline service and system needs. Through 10-year capital planning efforts, SN identifies upcoming projects that require funding to ensure reliable power in the years to come. In 2017, SN will continue the environmental review of the Colusa-Sutter Transmission Project, or CoSu. Funded by Sacramento Municipal Utility District, the CoSu line project is needed for local reliability and to increase SMUD's ability to import power from the Pacific Northwest. Since the review of the project was announced in December 2015, the SN team has received a lot of input from the public on the scope of the environmental impacts to review, and the team anticipates issuing a draft environmental impact statement for the project in July 2019. SN staff will also continue design and engineering work for the San Luis Transmission Project in 2017. The SLTP is needed to provide an economic benefit on behalf of Reclamation's San Luis Unit.



## UPPER GREAT PLAINS

The Upper Great Plains region markets more than 11 million megawatt-hours generated at eight dams and powerplants in the Pick-Sloan Missouri Basin Program—Eastern Division to more than 335 power customers in Montana, North Dakota, South Dakota, Nebraska, Iowa and Minnesota. UGP delivers enough hydropower to serve more than 3 million households, through more than 120 substations with 120 transformers and across 7,900 miles of federal power lines in its 378,000-square-mile service territory.



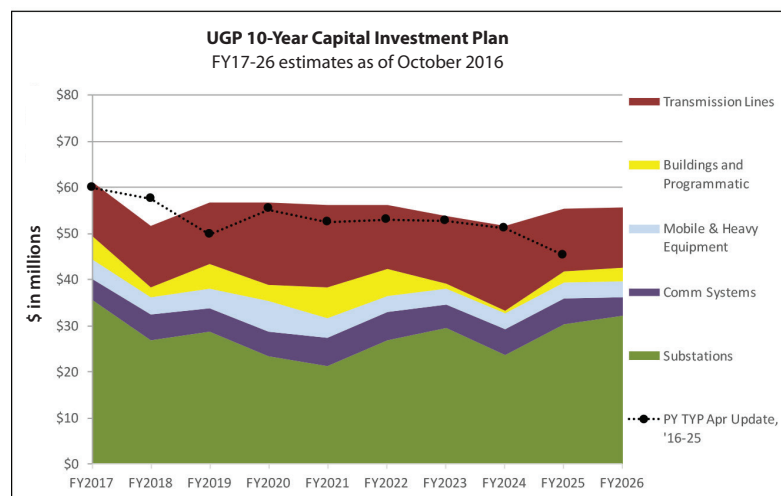
Maintaining the transmission system and restoring power after adverse weather conditions is a round-the-clock job. At the end of December 2016, UGP crews and operations staff sacrificed their holiday leave to restore power for communities in Montana and South Dakota after a blizzard paralyzed the grid for several days with ice and wind. Crews worked in adverse conditions on lines and transformers encased in ice to energize its facilities while local distribution owners also worked hard to restore power to local residents, particularly those in the Watertown, South Dakota, area.

UGP's preference customers include rural electric cooperatives, cities, towns, public utility districts, irrigation districts, state and federal agencies and Native American tribes.

As with the Loveland Area Projects customers, UGP staff implemented a rate decrease for the Pick-Sloan Missouri Basin Program Eastern Division customers, as costs associated with drought conditions in the 2000s were repaid ahead of schedule. The drought-adder reduction implemented January 1 represents a five-mill-per-kilowatt-hour reduction to current composite rates for UGP's customers, along with Rocky Mountain customers, resulting in roughly \$50 million saved annually in power costs for UGP and RM customers across Colorado, Wyoming, Montana, Kansas, Nebraska the Dakotas and the western sections of Minnesota and Iowa.

One year after UGP joined the Southwest Power Pool, analyses show that move has saved customers more than the amount of money originally estimated. As the first power marketing administration to fully join a regional transmission organization, this effort, in partnership with Basin Electric Power Cooperative and Heartland Consumers Power District, successfully transferred functional control of the integrated transmission system and UGP's eastern interconnection balancing area to the SPP. In addition, UGP's eastern interconnection load and generation was placed into the SPP Integrated Marketplace.

In 2017, UGP is prepared to support the interconnection requests and the prioritized capital projects to support the transmission system's long-term health and reliability, as well as growing demands for energy throughout the region. In FY 2016, 11 construction transmission projects were completed, 53 projects





were in progress and 31 were in the planning stages. A few projects highlighted in the 10-year capital planning effort that will be addressed this year include:

- **Groton South Substation:** A new 115-kilovolt substation near Groton, South Dakota, to support East River Electric Cooperative's new 115-kV transmission line, which is needed to provide voltage support to the area. The new substation will also alleviate congestion and maintenance issues.
- **Mingusville Substation:** A new 230-kV substation in Montana to sectionalize the Dawson County-Medora-Belfield transmission line to provide an interconnection for Upper

Missouri Generation and Transmission Electric Cooperative's member Goldenwest Electric Cooperative. The interconnection will serve two new oil pumping stations associated with the Baaken pipeline, along with other unplanned load growth related to oil activity in the area.

- **Brookings Substation:** To increase reliability for local customers—including the city of Brookings, South Dakota, South Dakota State University and several manufacturing facilities in the area—WAPA will reconfigure the existing substation to a breaker and a half configuration. This change will prevent customer power outages due to the loss of a single bus at the substation. The project will also replace the control building.

Yellowtail Dam







IN REVIEW

# FY 2016 hydrology conditions

**Editor's Note:** *The following report summarizes Fiscal Year 2016 data from the WAPA Hydropower Conditions webpage for straight power purchase costs, which are based solely upon hydrology, actual hydropower generation and related generation shortages. Readers may review all data by visiting [wapa.gov](http://wapa.gov), Power Marketing, Hydropower Conditions.*

One of the biggest challenges for hydropower is water variability due to intermittent drought and flooding. By definition, hydropower needs water to generate electricity. Without it, WAPA is forced to buy power on the open market from other sources to meet contractual obligations to its customers. This is referred to as purchased power.

In an ideal year, snowpack around the West is average or above average, yielding snowmelt runoff to recharge reservoirs behind the dams and powerplants that provide the energy WAPA markets. Federal dam owners like the Bureau of Reclamation, the Army Corps of Engineers and the International Boundary and Water Commission move water through federal hydropower plants primarily serving the non-power purposes of the dams. WAPA markets the power generated there to almost 700 preference customers. Our customers, in turn, sell that power to about 40 million Americans.

## Water around WAPA in 2016

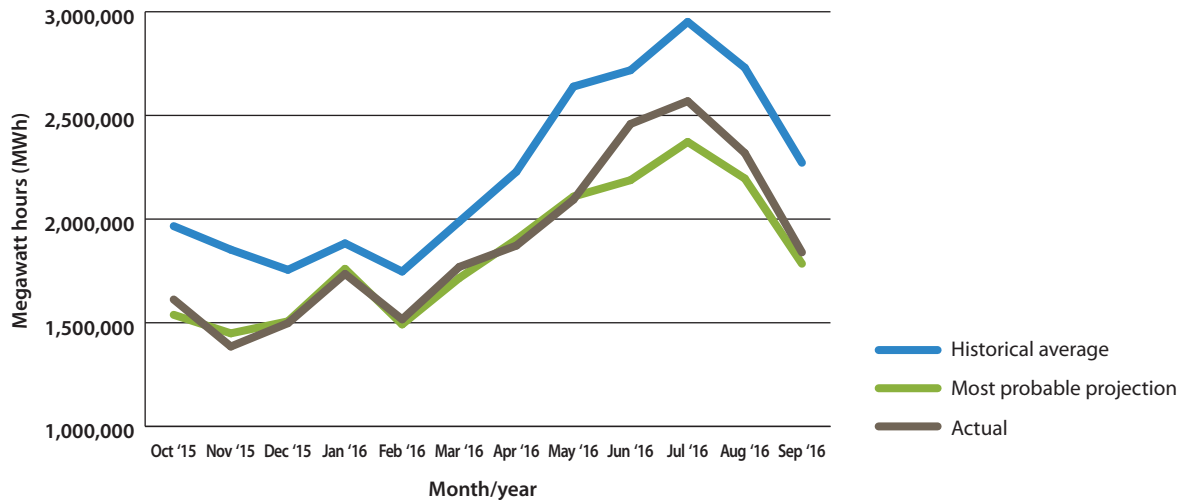
Actual generation was 84.8 percent of average across WAPA in Fiscal Year 2016, for a total generation of 22,668 gigawatt-hours. For the same period, total purchased power was 3,219 GWh with actual purchase power expenses of \$70,799,499, which equates to \$22 per megawatt-hour.

The Colorado River Storage Project Management Center projected most probable purchase power expenses for FY 2016 to be \$16,058,149. Actual purchase power expenses were lower, at \$12,585,578. The cost per MWh was \$26.55. Lake Powell, part of the Colorado River Storage Project, ended the fiscal year at around 53 percent of capacity with an elevation of 3,611 feet, which is about 121 feet above the minimum generation level. Throughout the fiscal year it held relatively steady between 45 and 57 percent of capacity.

The Desert Southwest region's hydrology is mostly dependent on the Colorado River Basin snowpack and precipitation above Lake Powell. The water year 2016 precipitation was 96 percent of average. The region's most probable projected purchase power expenses were \$3,939,758. Actual purchase power expenses were slightly over that amount, at \$3,971,587, with a cost per MWh of \$36.54. Lake Mead



## FY 2016 Hydropower Generation Average vs. Projected vs. Actual



ended the fiscal year with an elevation of 1,075 feet, about 25 feet above the minimum generation level. Throughout the fiscal year it hovered between 22 and 34 feet above the minimum generation level.

In the Rocky Mountain region, the overall reservoir content at the end of September was 120 percent of average. The overall reservoir content was above average for the entire water year, peaking in May at 128 percent of average. The Loveland Area Projects area remains mostly drought free, but with dryer than normal conditions in many areas. The Fiscal Year 2016 reservoir inflow was above average, as was the overall LAP reservoir storage at the end of September. The most probable projected purchase power expenses were \$9,801,480, but the actual purchase power expenses were \$11,177,360. The cost per MWh was \$26.74.

In the Sierra Nevada region, as of the end of September, cumulative precipitation of the Northern Sierra Eight Station Index was at 115 percent of average for the date, and 116 percent of the water year average. The cumulative precipitation was greater than average from March through the end of the water year. Accumulated inflow for the water year was 116 percent of the 15-year average for Trinity, 105 percent for Shasta, 111 percent for Folsom and 105 percent for New Melones. Reservoir storage as of the same date was 69 percent of the 15-year average for Trinity, 117 percent for Shasta, 67 percent for Folsom, and 43 percent for New Melones. The region began FY 2016 with a most probable projection of purchase power of \$14,794,735 and ended at \$16,786,308. The cost per MWh was \$28.10.

The Upper Great Plains region experienced lower than average snowpack in the 2015/16 winter season,

but in May heavy rains fell in the lower Missouri River valley causing increased inflows. The rains soaked the lower basin, causing continued curtailments of upstream hydro generation. The increased runoff did not provide more generation in 2016 but did allow the Corps of Engineers to maintain base flood control reservoir levels heading into 2017 runoff season. Total generation at the end of FY 2016 was 78.6% of average. UGP's most probable projection for purchase power was \$38,622,596. Actual purchase power expenses were significantly less at \$26,278,666 and the cost per MWh was \$16.22.

## Anticipating upcoming water year

The Seasonal Drought Outlook provided by the National Weather Service's Climate Prediction Center in November 2016 reported that most of the western third of the U.S. reported surplus precipitation, except for parts of the Southwest. Where surplus precipitation fell, drought was improved or removed. The outlook anticipates that near-record October wet conditions in the Northwest and wet winter climatology in the Far West should bring additional drought improvement or removal to southwestern Montana, eastern Oregon, northwestern Nevada and northern California, although drought is forecast to persist farther south.

The outlook also notes that weak La Niña conditions are present, but the Climate Prediction Center expects La Niña to be short lived.

For more information, please visit the National Weather Service's Climate Prediction Center online at [www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov).



## ASSET MANAGEMENT 2.0 PROGRAM

# Optimizing system health

The Transmission Asset Management Program is up and running, conducting critical facility analyses and creating a data-driven baseline that can be incorporated into all of WAPA's programs. In 2016, Asset Management produced its second-year health analysis for circuit breakers, power transformers and transmission structures. The data provides insight into budgeting, capital programs, prioritization and financial decisions resulting in a more resilient and reliable system.

Building on the asset management platform, in 2017 the Transmission Asset Management Program will create value and enhance data-driven decisions by combining staff's extensive field knowledge with insights gained from significant and actionable data, as well as further integrating sustainable funding and enterprise risk management across the organization.

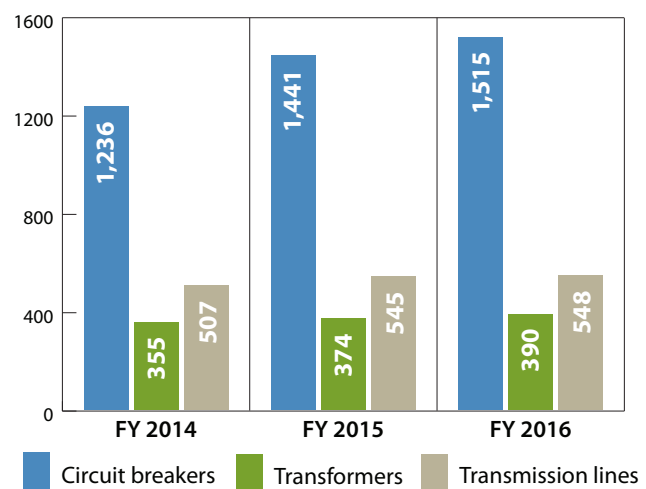
To do this, WAPA's Asset Management staff will team up with Operations and Maintenance to incorporate insights from real-time operations into contingency plans for upgrade projects that include high-risk equipment.

WAPA is also expanding its analytics in 2017 to include:

- Analysis of transmission line segments to improve condition assessment of the assets
- Evaluation of additional asset classes such as instrument transformers, which are data gatherers used by Operations to track the voltage at various points of the bulk electric system
- Monitor the condition of additional asset classes to provide greater insight into the system's reliability

Protecting assets through WAPA's physical security program will continue. Since 2014, staff assessed 180 of the organization's 300-plus substations. In 2017, staff anticipate assessing another 54 substations. Asset Management works with Security to drive the upgrades of our substations, transformers and other assets into the 10-Year Capital Planning process. We have tripled our security-based investments since 2013. During the next five years, WAPA anticipates adding multiple surveillance systems and the development of a cyber-secure power repayment study tool.

### AM Program Tier 1 Asset Summary WAPA-wide assets in AM Program



### Assets exceeding AM Program thresholds WAPA-wide

	Circuit Breakers	Transformers	Transmission lines
FY 2015	76	61	12
FY 2016	76	65	12

### Asset Risk Register Entries WAPA-wide\*

	Circuit Breakers	Transformers	Transmission lines
FY 2015	62	50	0
FY 2016	60	45	0

\*In FY 2015 and FY 2016, assets exceeding High Consequence Score Threshold were not mitigated under AM program activities.

### WAPA-wide Asset Risk Mitigation Activity Details July 1, 2015 to June 30, 2016

Total assets	Mitigation completed	Continuing mitigation	Mitigation actions		
			Replace	Other	Monitor w/o active mitigation
105	37	68	52	10	6

# Future cost-containment in the works

**A**t WAPA, we are committed to keeping both our indirect and direct operational costs low. Costs rising in one part of WAPA have to be balanced by decreases in another. Staff leverage Continuous Process Improvements and program reorganization to maintain overhead representing around 10 percent of costs found in rates, WAPA-wide.

## 2016 CPI Projects completed

- Streamlined Accounts Payable Invoice processing
- Sequenced the *Federal Register* Notice process
- Consolidated Colorado River Storage Project Power Billing process
- Streamlined the Recruitment Incentives approval process
- Developed the HQ Budget Feedback process

**TOTAL  
savings  
for 2016:  
\$2.69M**

## 2017 CPI Projects planned

- Streamline the Purchase Requisition process
- Develop WAPA-wide 10-year capital planning funding allocation process
- Improve capture of power system change data
- Develop a consistent services requirements package for procurement
- Develop Colorado River Storage Project electronic records management process

# Industry changes driving planning, preparation

**W**APA has been engaged in industry changes and market participation discussions since 2011. Continuing to coordinate with customers to address their needs and planning ahead drives WAPA's efforts and evaluation of various scenarios.

In 2015, the Upper Great Plains Integrated System in partnership with customers joined the Southwest Power Pool, making WAPA the first power marketing administration to fully join a regional transmission organization, or RTO. In January 2017, WAPA and the other Mountain West Transmission Group participants took another step together in a region that is currently outside any RTO territory. Mountain West announced it is holding further discussions with an RTO, as part of the effort to find shared success among the entities involved. The goal is to increase flexibility, remove rate pancaking and ensure continued delivery of WAPA's mission consistent with sound business principles.

Ultimately, collaborative efforts like Mountain West result in a stronger utility industry as a whole. The Mountain West effort will position WAPA for the future as an example of the key role it plays in the West. It also advances the widespread use of America's valuable hydropower resources.

WAPA's decisions for evaluating the energy landscape are driven by careful analysis, conducted by both internal and independent sources, to calculate the costs and benefits. For WAPA the cost equation is as critical as the savings. As a low-cost power provider in the 15 states WAPA serves and an open-access transmis-

sion provider, WAPA guards against customer rates being negatively impacted.

Following an open and transparent process, WAPA facilitates a public process to gain input on its market participation decisions. This practice allows WAPA to share with stakeholders the short- and long-term impacts and costs based on detailed analyses of all inputs and outputs. Mountain West anticipates making a decision regarding RTO participation in mid-2017.

As markets expand and change in 2017 and beyond, WAPA will keep a pulse on the industry dynamics and the impacts for its operations and its customers. Strong customer service means also looking at WAPA's organization itself. As WAPA actively participates in market strategies, it is evaluating how to optimize performance amid an era of significant industry change. WAPA is taking a look at the work performed by its power operations, merchant and settlement functions to understand how any potential decision to join a market could affect those functions, and what might be needed to best position WAPA to thrive in any new market scenario.

WAPA will continue to actively engage in new market initiatives so it can best position itself to continue to deliver valuable services to its customers in this changing industry environment.

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CUSTOMER **Circuit**  
WINTER 2017

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